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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/718,583	11/24/2003	Bruce C. S. Chou	3722-0170P	1689
2292	7590	09/17/2004		EXAMINER
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			KWOK, HELEN C	
			ART UNIT	PAPER NUMBER
			2856	

DATE MAILED: 09/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/718,583	CHOU, BRUCE C. S.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Helen C. Kwok	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on November 24, 2003.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-21 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-21 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                                                                                        |                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                                            | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                                   | Paper No(s)/Mail Date. _____                                                |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>November 24, 2003</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|                                                                                                                                                        | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Claim Objections***

2. Claim 8 is objected to because of the following informalities. Appropriate correction is required.

In claim 8, line 2, what is the word "its" referring to? In line 2, the phrase "the vaporization point" should be changed to -- a vaporization point --.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –  
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-6, 13 and 20-21 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,581,034 (Dao et al.).

Dao et al. discloses a convective accelerometer and inclinometer comprising, as illustrated in Figures 1-21, a substrate 20; a heater 16 arranged on the substrate; at least two temperature sensing members 12,14 symmetrical arranged at opposite side of

the heater and on the substrate; a cap 22 arranged above the substrate to cover and encapsulate the heater and the sensing members; and a liquid filled into a chamber formed between the cap and the substrate. (See, column 3, line 44 to column 4, line 51; column 7, lines 44-54).

With regards to claims 2-6, 13 and 20-21, Dao et al. further discloses the substrate is of silicon; the material for the heater and the temperature sensing members is metal (i.e. platinum or tungsten) and the temperature sensing members is a thermister such that the inertial sensor is being applied to an accelerometer or an inclinometer. (See, column 6, lines 21-65).

5. Claims 1-6, 9, 11 and 13-21 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,182,509 (Leung).

Leung discloses an accelerometer comprising, as illustrated in Figures 1-16, a substrate 10; a heater 23 arranged on the substrate; at least two temperature sensing members 22,24 symmetrical arranged at opposite side of the heater and on the substrate; a cap arranged above the substrate to cover and encapsulate the heater and the sensing members; and a liquid filled into a chamber formed between the cap and the substrate. (See, column 3, line 24 to column 4, line 33).

With regards to claims 2-6, 9, 11 and 13-21, Leung further discloses the substrate is of silicon; the material for the heater and the temperature sensing members is metal (i.e. platinum or tungsten); the substrate is anisotropic etched to form a groove 20 such that the heater and the temperature sensing members are suspended above

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the groove; and the temperature sensing members is one of a thermister, thermocouple, thermopile such that the inertial sensor is being applied to an accelerometer or an inclinometer. (See, column 4, line 34 to column 8, line 20).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 7-8, 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over either U.S. Patent 5,581,034 (Dao et al.) or U.S. Patent 6,182,509 (Leung) in view of U.S. Patent 6,171,880 (Gaitan et al.) and Publication titled "A Micromachined Thermal Accelerometer" (Bugnacki et al.).

With regards to claim 7, the references do not explicitly disclose the fluid as water. It is well known in the art to an artisan to recognize one can use water or any other type of fluid as the medium within the inertial sensor.

With regards to claim 8, the references, Dao et al. and Leung, teach the phase transition of the liquid when heated by the heater; however, do not explicitly disclose a thermal bubble formed around the heater. Bugnacki et al. discloses a micromachined thermal accelerometer, as illustrated in Figures 1-4, wherein the heater is heated till a temperature reaches a vaporization point and a thermal bubble is formed around the

heater. (See, pages 1-4). It would have been obvious to a person of ordinary skill in the art at the time of invention to have readily recognize the advantages and desirability of heating the medium to a temperature such that a thermal bubble is formed due to a phase transition as suggested by Bugnacki et al. to the sensor of Dao et al. and Leung to provide a novel accelerometer based on thermal convection that has only one moving element, namely a bubble of heated air hermetically sealed inside a sensor package cavity wherein the bubble moves in a manner analogous to the external force being applied.

With regards to claims 10 and 12, Gaitan et al. discloses a convective accelerometer comprising, as illustrated in Figures 1-5, the heater is composed of a suspended membrane 14 having a plurality of symmetrical bridge beams extending outwardly from four corners of the membrane and the temperature sensing members 20,22,24,26 are supported by at least one of the bridge beams. (See, column 4, line 11 to column 5, line 44). It would have been obvious to a person of ordinary skill in the art at the time of invention to have readily recognize the advantages and desirability of employing the structural arrangement of Gaitan et al. to the apparatus of either Dao et al. or Leung to provide a more efficient and economical apparatus which enables batch fabrication of the sensor devices herein a very large number of temperature sensing and heater elements of the devices are first patterned in parallel on a common substrate and the maskless etching operation is carried out for all devices at the same time. (See, column 2, line 52 to column 3, line 16 of Gaitan et al.).

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helen C. Kwok whose telephone number is (571) 272-2197. The examiner can normally be reached on 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron E. Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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Helen C. Kwok  
Art Unit 2856

hck  
September 14, 2004